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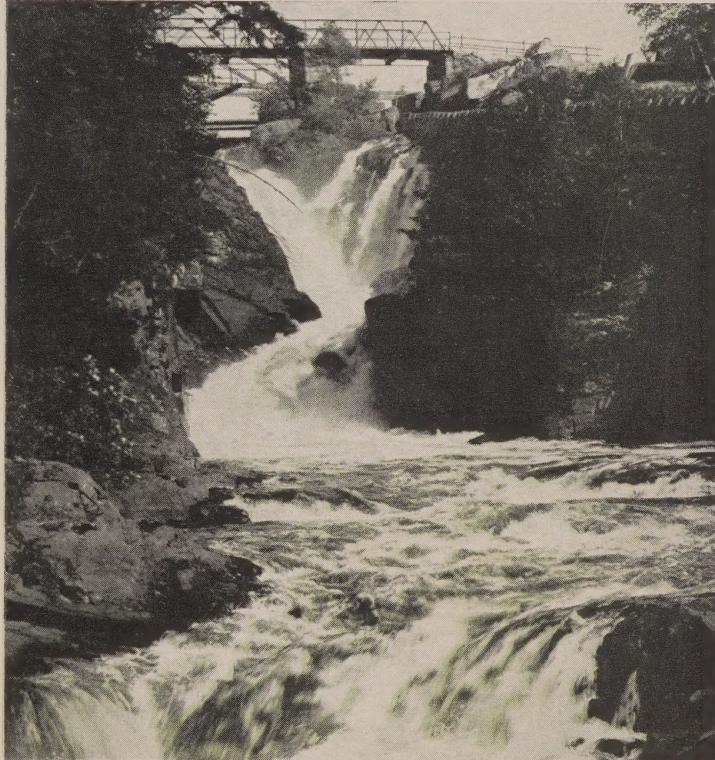
Vol. V.

No. 3

The Butterfield

Hydro-Electric Power Commission
of Ontario

MARCH, 1919



SOUTH FALLS, MUSKOKE RIVER

E. Aude

THE
BULLETIN

PUBLISHED MONTHLY BY THE

**Hydro-Electric Power
Commission of Ontario**

ADMINISTRATION BUILDING
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TORONTO

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MARCH, 1919

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Editorial

A New Hydro Paper

WE wish to take this opportunity to congratulate the London Public Utilities Commission on its initiative in being the first Hydro Municipality to establish a monthly magazine. This interesting publication is called *The Live Wire*. Its aim is "to provide the staff and the citizens of London with a source of information regarding the activities of the departments; to provide a medium through which matters of common interest may be discussed; and to promote a spirit of co-operation between the different departments and the citizens of London in general.

O. Elwood is the editor of *The Live Wire*, the second issue of which has just come from the press. Mr. Elwood is to be congratulated upon the paper which he is publishing.

We are of the opinion that this venture will prove highly successful and we are sure that the London Commission will reap the reward to which its foresight and initiative entitle it.

Good luck—*Live Wire*.

Convention—A.M.E.E.

IN this issue we are publishing a good deal of material which was presented at the recent Convention of the A.M.E.E. This was in many ways the most successful Engineer's Convention on record. The subjects considered were timely and there was a great deal of helpful discussion. There is every reason to believe that the June Convention at Niagara Falls will also be an exceptionally interesting one.



Technical Section

The Thermal Storage Demand Meter

By PERRY A. BORDEN
Assistant Laboratory Engineer

TN an article on Maximum Demand, appearing in THE BULLETIN for November, 1917, reference was made to a new and interesting type of demand meter, developed by Mr. Paul M. Lincoln, operating upon the principle of heat storage. Since then the meter has been brought to such a state of development that its success seems assured; and it is now being manufactured on a commercial basis in Canada. Extensive and varied tests upon the meter, and investigations of its operating principles made in the Commission's Laboratories, have shown that the system of measuring demand by heat storage, as developed by Mr. Lincoln, satisfies a long felt want, and places within the category of demand-metered loads many customers whose billing has heretofore been of a very problematical nature. As these meters will soon make their appearance on commercial loads, and will, if expectations are fulfilled, be used later to a very large extent, it is fitting that the following paragraphs should appear as an introduction of the instrument to its prospective users.

The application of the principle of heat storage to the measurement of maximum demand is not a new one, having been employed commercially since 1896 in the Wright demand meter. This meter, however, indicated only the maximum current demand and was of course entirely unsuited to use on polyphase circuits. Neither is the thermal wattmeter a new invention, having been patented in England as early as 1897. To Mr. P. M. Lincoln, however, falls the credit of adapting the principle of heat-storage to the thermal wattmeter, thus evolving the thermal watt-demand meter. Following is a brief description of this meter as now being built.

Referring to Figure 1, A is a circuit feeding a load B. C is a small transformer incorporated within the meter with its primary across the circuit A. In series with the secondary of this transformer are two equal resistances R_1 and R_2 . A current is, of course, set up on these resistances that is proportional to the voltage of the circuit A. The load current is also caused to circulate through these same resistances in the manner shown in Fig. 1, being taken into

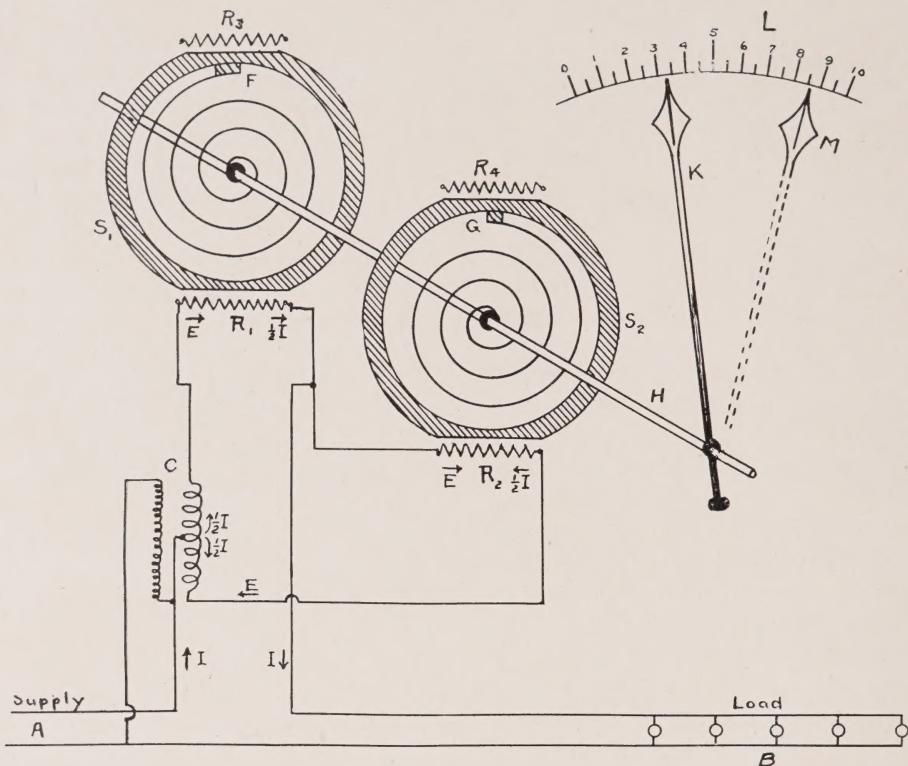


Fig. 1

LINCOLN THERMAL STORAGE DEMAND METER

the middle of the secondary of the small transformer and being taken out at the connection between resistances R_1 and R_2 . These two currents—one the secondary current, due to the presence of the voltage and the other due to the passage of the load current are additive in one of these resistances and subtractive in the other, and the difference in the heating effect of the two resultant currents is proportional to the watts of the load B .

If we represent the current that passes through the resistance R_1 and R_2 , due to the presence of the voltage by E , and the load current therein by I , the resultant current in one of the resistances is $E + \frac{1}{2}I$ and in the other, $E - \frac{1}{2}I$. In the resistance R_1 the heat developed will be proportional to $(E + \frac{1}{2}I)^2$, while, in R_2 , it will be $(E - \frac{1}{2}I)^2$. The difference between these two quantities is:—

$$\begin{aligned}
 & (E + \frac{1}{2}I)^2 - (E - \frac{1}{2}I)^2 \\
 & = E^2 + EI + \frac{1}{4}I^2 - E^2 + EI - \frac{1}{4}I^2 \\
 & = 2EI
 \end{aligned}$$

which is a quantity representative of the watts in the circuit.

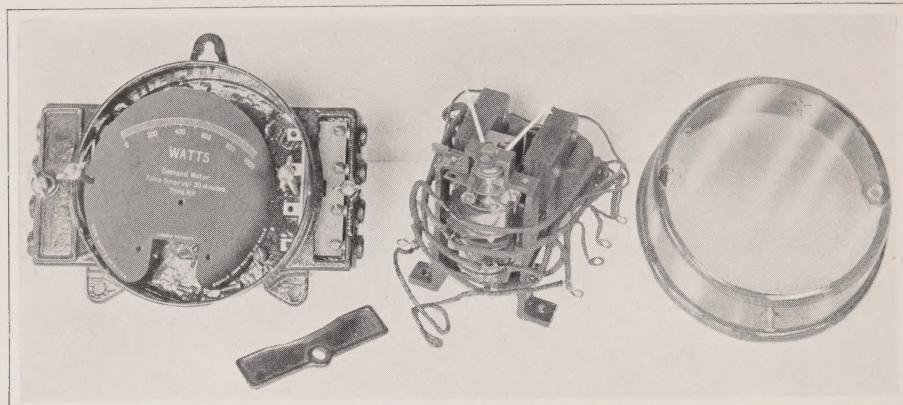
It may be shown that this device constitutes a true thermal wattmeter and that its indications are always proportional to the watts, quite independently of power factor and wave-form.

F and G represent two spiral springs made from bimetallic strip, attached rigidly to their casings at the outer ends and to a common shaft H at their inner ends. These bimetallic springs tend to coil up on an increase in temperature (due to the difference in temperature coefficient of the two metals of which they are composed) but, since the two springs are wound in opposite directions, no movement of the shaft H will take place unless there is a difference in temperature between F and G. The shaft H, therefore, will not turn with changes in atmospheric temperature or with any other condition that causes both springs to maintain the same temperature, but will respond only to the difference in temperature caused by the difference in the losses in resistances R_1 and R_2 .

The instrument as described above constitutes a wattmeter, and would, if so constructed show like any indicating wattmeter the *instantaneous* values of the load. But in the measurement of demand a certain time element must be recognized; and the actual period of time used varies over wide limits, from

one minute to one hour. The thermal wattmeter may be designed to give the average consumption over any desired length of time, but once constructed is not subject to adjustment of this period. In the electro-mechanical types of demand meters it is customary to introduce the time element by a clock, or by some mechanical interlocking system, between a wattmeter and a watt-hour meter. In the electro-thermal type of instrument, these mechanisms are not necessary, as the time element may be introduced by loading the resistors with masses to be heated. As it takes much longer to heat a large mass of metal than a small, when the same amount of energy is supplied, the time required for these masses to reach a given temperature can be regulated to a nicety by adjusting the thermal characteristics of the elements. These loading elements are made in the form of cylindrical cases containing the bi-metallic springs (represented by S_1 and S_2 in Figure 1) and may be made of a thickness and radiating surface to give the desired time period.

Upon the application of energy to the resistors their temperature, together with that of the bi-metallic springs and of the containing drums begins to rise, and increases according to what is known as a "logarithmic law," continually approaching a condition of balance between the energy input and the radiation of the heated masses. This is exactly the same law as is followed by the heating of electrical apparatus; and the pointer K attached to the shaft H will therefore indi-



Indicating Thermal Demand Meter partly dis-assembled

cate a value representing the heating of the equipment connected to the circuit. M is a loose pointer which shows the highest excursion of pointer K since last reset.

The description given above deals only with the connections for a single phase load; but for a polyphase load it is necessary only to duplicate the electrical connections and energise another pair of resistors (R_3 and R_4) applied to the same spring cases. The radiating drums, the springs and the indicating mechanism remain unchanged. Thus it will be seen that the additional cost of the polyphase meter is so little more than the single phase that practically nothing would be gained by developing them in separate types. Similarly, the only difference in design for different frequencies being in the more liberal use of material for the lower frequency transformers, and the adjustment remaining the same, it is advantageous for a system employing several periodicities to have all its instruments designed for the lowest

frequency, when they may be used interchangeably on all sections.

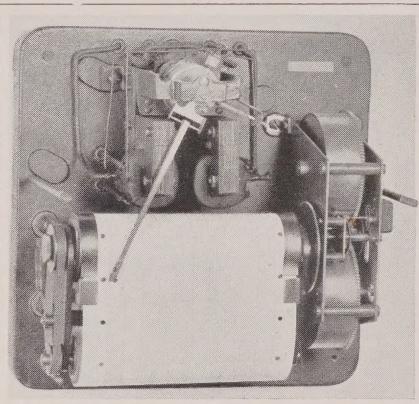
Figure 2 illustrates a thermal storage meter of the indicating type partly disassembled, showing the principal elements. Figure 3 is made from a photograph of a graphic instrument with the cover removed. The two cylindrical cases, each containing a coiled bimetallic spring, may be observed at the top of the instrument. The thermal storage capacity of these cases is so designed that it requires thirty minutes for them to acquire 90 per cent. of their final temperature on a steady application of load. The only difference between the working parts of the indicating and the graphic meter is in the addition of the clock, paper rolls and recording mechanism in the latter.

A thermal storage meter thus constructed always indicates what may logically be called the "logarithmic average" of the power consumption during the particular time period immediately preceding the instant of observation. Probably

the simplest way of explaining the significance of the indications of this instrument is by the statement that its readings are representative of the heating of electrical apparatus connected to the system, and, since heating is usually the limiting factor of the supply system, they form a fair basis of charging the customer for the power he is consuming. The logarithmic average is not an average in the commonly accepted sense of the word. When we use the word "average" in the usual sense we assume that each instant of time over which the average is taken has equal weight. In the resultant obtained by a heat storage meter each instant of time has not an equal weight; but the influence of each instant decreases with its remoteness in point of time. For want of a better name we call this quantity the "logarithmic average" as contrasted with the commonly accepted, or "arithmetical average."

The question has been raised as to whether the values of demand as determined by the thermal storage type of instrument are legally applicable in contracts where it has been customary to use demand meters of the electro-mechanical type. The answer to this must lie in the form of the contract. In the Standardization Rules of the American Institute of Electrical Engineers the definition of *demand* has purposely been left very broad, and the term cannot yet be said to be legally defined. It has been customary, therefore, to embody in contracts making use of that quantity, some specification as to what kind of demand was implied, either by stating what

type of meter should be used, or by applying some term which would include the indications of any type which it was proposed to use. In some contracts we find the term "integrated demand," which is supposed to cover the readings of all meters of the electro-mechanical type. Unfortunately, however, none of these meters do infallibly measure the arithmetical average, and their readings, therefore, cannot be depended upon to be a true in-



Graphic Thermal Demand Meter with cover removed

tegration of the maximum demand. Moreover, although there is little doubt that arithmetical average is the meaning implied by "integrated demand," the laws of mathematics teach us that an integration may be performed according to a logarithmic law as readily as by an arithmetic. We have, then, as much justification in calling the readings of the logarithmic meter the "integrated demand" as those of the arithmetical type.

Although the mathematical laws embodied in the computation of logarithmic average are entirely different from those concerned in the calculation of the arithmetical, the final results do not differ greatly when meters embodying the respective principles are connected in an actual power load. Upon a perfectly steady load the readings are in exact agreement; and the discrepancy is considerable, only when the loads become highly fluctuating. Unfortunately upon the latter class of loads it is almost impossible in many cases to determine either by measurement or by calculation the true maximum arithmetical demand, so that the exact magnitude of the discrepancy in such cases cannot be learned. The facts remain, however, that the logarithmic average is usually lower than the other, only exceeding it upon sudden and extreme peaks; and that, when, due to an inherent characteristic, the thermal meter does depart from the true logarithmic value it is slightly low; which may always be considered the "safe" side and cannot be attacked by the customer.

With a view to determining the discrepancies of the results of different methods of establishing maximum demand, very extensive tests have been made by the Commission both in the Laboratories and in the field with these meters connected in on commercial circuits. Of particular interest are the results of two tests made with two characteristic types of load. One set of readings was taken on the total load of the Laboratory Building, which typifies a good class of industrial load curve;

the other set of values was obtained on a section of street railway carrying about twelve cars, and giving the highly fluctuating load typical of electric railway service. Following are the results which were obtained. The maximum demands, averaged over several days in each case, are shown, and for convenience the reading of the thermal meter has been taken as a basis of comparison, and assigned a value of 100 per cent.

FAIRLY STEADY INDUSTRIAL LOAD

Thermal 30 Min.	Clock type ("R.O.")			Lagged 10 Min.	Sustained 10 Min.
	15 Min.	10 Min.	10 Min.		
100	100.5	111.4	98.7		

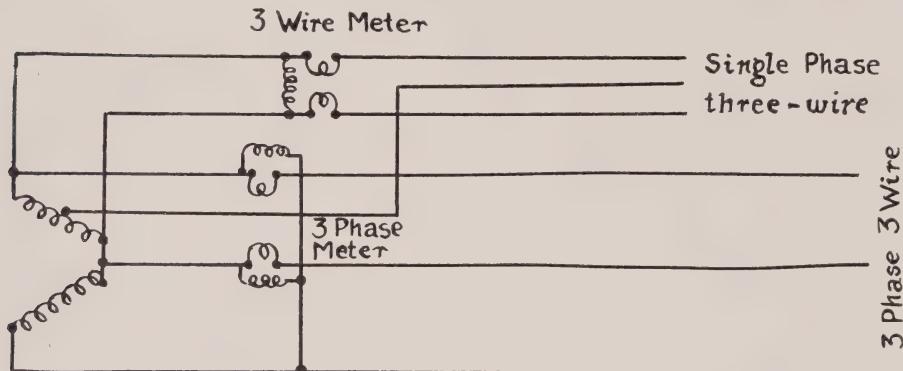
VERY FLUCTUATING STREET RAILWAY LOAD

Thermal 30 Min.	Clock type ("R.O.")			Lagged 10 Min.	Sustained 10 Min.
	Clock 15 Min.	Clock 10 Min.	Lagged 10 Min.		
100	111.5	119.7	111.5		54.6

At the time the above tests were made, the thirty minute instrument was the only thermal storage meter available, and the tests were made with such apparatus as was at hand, hence the discrepancy of time periods. Since then the thermal meter has been developed with a ten minute period; and comparative tests have been made between it and the thirty minute meter. These tests are still in progress. One run was made with the two installed on a machine shop load, the meters being read and reset every day for several weeks. During this time the maximum variation between the meters was 4%; the average of the run showing the ten minute meter 2% higher than the thirty minute.

The thermal storage demand meter is at present being manufactured in Canada in its indicating form, in 100, 200 and 500 volt ratings with a current capacity of 5 amperes for use with series transformers. These instruments are equally suitable for polyphase or single-phase work, the difference being only a matter of wiring. As at present designed they

may be used interchangeably upon twenty-five or sixty cycle circuits. The appearance of the graphic thermal meter has been delayed by the difficulty in obtaining a thoroughly satisfactory clock mechanism; but now that the stress of war is being relieved there is no doubt that this problem will soon be solved.



*This is a correction of a sketch which appeared in the last number of "The Bulletin,"
"Measurement of Total Load on Combined Single Phase and Three Phase Systems."*

ATTENTION!

MANAGERS AND SUPERINTENDENTS OF MUNICIPALITIES

May we here draw your attention to stereotypes illustrated on Page 96, which may be had free on application to Publicity Department.

These will help increase your lamp sales.

Minutes of Convention of Association of Municipal Electrical Engineers held at Toronto, Jan. 30 and 31, 1919

January 30 (Afternoon Session)

The meeting was called to order at 2.45 o'clock in room C 26, Chemistry and Mining Building, University of Toronto. The President, Mr. E. V. Buchanan, opened the meeting with a short address in which he spoke of the lessons taught by the war and also of what the future had in store as to the sale of electricity.

Owing to the absence of the Treasurer, Mr. R. C. McCollum, the Secretary, Mr. S. R. A. Clement, presented his report for the year just closed. This report showed the following—

Receipts.....	\$915.50
Disbursements.....	698.13

Balance, cash on hand..... \$217.37

The Secretary then read a letter from Mr. W. B. Johnson of The Montreal Light, Heat and Power Consolidated, advising of his inability to be present at the meeting and of his having requested Mr. E. H. Porte of the Renfrew Electric Manufacturing Company to read his paper for him.

A letter from Mr. Fred W. Field, H.M. Trade Commissioner, enclosing a resolution recently passed by the Executive Council of the Canadian Pulp and Paper Association was also read. This resolution advocated extreme caution in the purchase of all goods stated to be of Swedish,

Dutch or Swiss origin, and that goods of German or Austrian manufacture be refused.

Moved by Mr. E. I. Sifton, seconded by Mr. J. E. B. Phelps—

That the report of the Treasurer be accepted. (Carried).

Moved by Mr. E. J. Sifton, seconded by Mr. M. J. McHenry—

That the resolution from the Canadian Pulp & Paper Association be placed on file and that Mr. Field be advised accordingly. (Carried).

Mr. O. H. Scott, Chairman of the Membership and Credential Committee reported that since the previous meeting the municipalities of Hespeler and Waterford had become members of the Association.

Moved by Mr. O. H. Scott, seconded by Mr. E. H. Campbell.

That the following be elected Associates of the Association:—

Charles Meyrich and W. P. Baulch, both of The Hydro-Electric Power Commission of Ontario.

Also that the following be elected to commercial membership:—

Utility Electric Mfg. Co., Lancashire Dynamo and Motor Co., Ferranti Electric Co. of Canada, Ltd., Eugene F. Phillips Electrical Works, Ltd., Renfrew Electric Mfg. Co., Ltd., The Nineteen Hundred Washer Co., Canadian Westinghouse Co., Ltd., Moffatt Stove Co., Ltd., Canadian General Electric Co., Ltd.,

Packard Electric Co., Ltd., National Electric Heating Co., Ltd., Hughes Electric Heating Co., Hurley Machine Co., Ltd., Canadian Porcelain Co., Ltd., Canadian Crocker-Wheeler Co., Ltd., Chamberlain-Hookham Meter Co., Ltd., Canadian Laco-Phillips Co., Ltd., Northern Electric Co., Ltd., Acme Stamping and Tool Works, Ltd. (Carried).

Reports were then made by Mr. V. S. McIntyre, Chairman of the Papers Committee, and by Mr. R. H. Martindale, Chairman of the Rules and Regulations Committee.

The Chairman advised the Association of a luncheon to be held by the Electric Club on the following day, which would be open to all members of the Association who might wish to attend. He also drew attention to the special meeting of the Toronto section of the American Institute of Electrical Engineers to be held on the evening of the 31st to which the Association was invited.

Messrs. R. H. Martindale, A. T. Hicks and O. M. Perry were appointed a nominating committee.

Mr. E. G. Porte of the Renfrew Manufacturing Company read a paper by Mr. W. B. Johnson of the Montreal Light, Heat and Power Consolidated entitled "The advisability of Electric Companies handling Appliances and Supplies and maintaining standard prices as established by the Manufacturers."

Discussion following this paper was participated in by Messrs. W. L. Goodwin, O. M. Perry, J. F. S. Madden, E. I. Sifton, H. H. Couzens, V. S. McIntyre, K. A.

McIntyre, J. G. Archibald, H. O. Fisk, Geo. E. Whiton, H. F. Shearer, F. M. Dusenbury, C. T. Rutland, and J. E. Skidmore.

Moved by Mr. J. J. Heeg, seconded by Mr. R. H. Myers—

That reprints of Mr. Johnson's paper with the discussion on the same be made and a copy mailed to each municipal electrical commissioner together with a copy of this resolution. (Carried).

Moved by Mr. R. H. Martindale, seconded by Mr. V. S. McIntyre.

That the meeting pass a vote of thanks and that the Secretary send him a copy of this discussion. (Carried).

Mr. A. S. L. Barnes of the Hydro-Electric Power Commission of Ontario, presented a paper entitled "Bare versus Weatherproof-covered wires for Potentials above 750 volts."

This subject was discussed by A. G. Lang, Wills MacLachlan, E. F. Latimer, J. W. Cook, T. E. Bell, L. G. Ireland, J. J. Heeg, H. O. Fisk, V. B. Coleman, T. C. James, E. I. Sifton, E. M. Ashworth, W. R. Ostrom, W. F. Wright, R. H. Martindale, C. W. Alford, W. F. McKnight, E. R. Lawler, W. H. Mulligan and J. J. Jeffery.

It was suggested that a committee composed entirely of superintendents and managers be appointed to consider the question of the use of bare wire and report to the Association at its next regular meeting. The President promised to appoint such a committee.

The meeting adjourned at 5.45 o'clock p.m.

Evening Session

The Association met at the Carls-Rite Hotel at 6.30 o'clock for dinner. After dinner, there were short addresses by Mr. W. L. Goodwin and representativees of the newly elected commercial members. Mr. C. H. Hopper of the Canadian Westinghouse Company, as speaker of the evening, took for his subject "Following the Hydro line," in which he outlined some of the phases of the personal element encountered by salesmen.

January 31 (Morning Session)

The meeting was called to order at 9.45 o'clock.

Immediately after opening, the meeting was advised of the death of one of their members in the person of Mr. W. R. Clark of Beaverton, who had passed away on the morning of the 25th.

Moved by Mr. J. E. B. Phelps, seconded by Mr. H. H. Couzens—

That the Secretary be instructed to write, on behalf of the association, a letter to Mrs. Clark extending to her the sympathy of the members in her recent bereavement. (Carried).

Mr. W. L. Goodwin of the General Electric Company delivered an address on the Goodwin plan.

The Chairman expressed his regret that Sir Adam Beck could not be present to hear Mr. Goodwin's talk, owing to his having gone to California. He also read a note from Mr. Samuel Chace of the Westinghouse Company, who is working along the same lines as Mr. Goodwin, regretting that he could not be at the meeting with him.

Discussion on Mr. Goodwin's address was taken up by Messrs. E. I. Sifton, P. B. Yates, L. G. Ireland, J. E. B. Phelps, E. V. Buchanan, J. F. S. Madden and F. W. Chapman.

Moved by Mr. O. H. Scott, seconded by Mr. R. H. Martindale.

That a hearty vote of thanks be extended to Mr. Goodwin for his very instructive address. (Carried).

Election of officers for the coming year and fixing the place of the next meeting was the next order of business.

Moved by Mr. O. H. Scott, seconded by Mr. J. E. Phelps—

That the Constitution and By-laws be suspended and that the by-law in reference to Commercial members (Clause 4 d.) be amended to read, "Commercial members shall have no voting rights or rights to hold office except as members of Committees." (Carried).

Mr. O. M. Perry, reporting on behalf of the nominating committee, suggested two places for the next meeting, viz., Windsor and Niagara Falls,—suggested dates, Thursday and Friday, June 12th and 13th. On a standing vote the decision was in favor of Niagara Falls, 24 voting for Niagara Falls and 18 for Windsor.

Messrs. L. G. Ireland, J. F. S. Madden and T. C. James were appointed scrutineers.

Officers elected were:—

President.....O. H. Scott.

Vice-President....M. J. McHenry.

Secretary.....S. R. A. Clement.

Treasurer.....R. C. McCollum.

District Vice-Presidents:—

Niagara District..P. B. Yates.

Central " ..W. E. Reesor.

Eastern District . . H. F. Shearer.
 Northern " . . R. H. Martindale.
 Georgian Bay . . E. J. Stapleton.

Convention Committee:—

V. S. McIntyre—Chairman.
 E. I. Sifton.
 R. T. Jeffery.
 Geo. C. Rough.
 J. W. Bayliss.

The appointment of the Papers Committee and the Rules and Regulations Committee was left to the Executive Committee. The following were appointed:—

Papers Committee:—

H. H. Couzens—Chairman.
 L. G. Ireland.
 E. V. Buchanan.
 A. B. Cooper.
 C. H. Hopper.

Rules and Regulations Committee:—

A. T. Hicks—Chairman.
 T. C. James.
 E. H. Porte.
 R. H. Staford.
 H. F. Strickland.

The meeting adjourned at 12.30 o'clock.

Afternoon Session

The meeting was called to order at 3 o'clock in Room 25, Engineering Building, University of Toronto.

Mr. H. W. Price, Associate Professor of Electrical Engineering, University of Toronto, gave a demonstration and talk on Power Factor. Before beginning his demonstration, Mr. Price, speaking for the University of Toronto, welcomed the Association, and advised of its readiness and willingness to assist the Association at any future time, as was being done on this occasion. He also gave an outline of the work the University

was doing on the Soldiers' Re-Establishment.

His talk on Power Factor was illustrated by large scale instruments, and an oscillograph provided with a screen. In simple language and by methods easily understood by the un-initiated, he showed the effects on transmission, transforming, and generating equipments of loads having various values of power factor. How with low power factors a great portion of the current carrying capacities of systems are used up uselessly, resulting in lowered voltages at the receiving end. In addition to pointing out the detrimental effects of low power factor, the remedies for this condition were also brought out.

Moved by Mr. V. S. McIntyre, seconded by Mr. O. H. Scott—

That a hearty vote of thanks be extended to Mr. Price for his very interesting and instructive talk and demonstration. (Carried).

The meeting adjourned at 5 o'clock p.m.

February 1 (Morning Session)

On this morning the delegates paid a visit of inspection to the Laboratories of the Hydro-Electric Power Commission of Ontario.

The register shows the attendance at the Convention to have been 141 made up as follows:—

Class A Delegates	45
Class B Delegates	16
Associates	25
Visitors from Municipalities	3
Visitors from companies elected to Commercial Memebership	34
Other visitors	18

President's Address

(E. V. Buchanan)

This is the first anniversary of the A.M.E.E. of Ontario and we have every reason to celebrate. Everyone grants that the convention at Niagara Falls was a success, and this meeting gives every indication of being equally successful. I am very optimistic, I have visions of every city in Canada having a municipal electric plant in the near future and then there will be an organization extending from coast to coast. It is natural that on an anniversary or at the beginning of a new year one should look into the future and make resolutions. Our resolutions should be based on the ideal we have gained in the war and apply to the reconstruction period. The war has taught the least discerning what may be accomplished when all elements work together for common good. The individual members of the Association should keep before their eyes the good of the association; the association should work for the good of the province and the Dominion by the development of electrical science. What science in this present day can do more for national prosperity? Electricity is the greatest factor in commercial prosperity, but is it not also almost the greatest factor for human contentment, without which commercial prosperity is worthless?

In the next year or two a greatly

increased power supply will be available. It is our duty to find a market for this power, and here again let me give expression to my optimism, by telling you that it is an easy task we have, but like any other task it may be done well or badly. It is just as imperative that we should do our bit now as in wartime.

Hydro assuredly had its war burdens, but no observer can escape the conclusion that it has gained more public recognition of its service potentiality than would have been possible in a decade of normal conditions. The people will not forget the great importance of Hydro to our communities and to the Dominion. It seems therefore that we have gained a good deal out of the circumstances of the war, even if temporarily the burdens were heavy.

With these few abstract observations in mind I would call your attention to the programme submitted by the papers committee. Merchandizing policies are featured prominently as naturally they should be at a time such as the present; better methods of construction are given consideration in the discussion of bare and covered wire for distribution, while the technical is not forgotten as an interesting talk and demonstration on the oscillograph is to be provided.

Treasurer's Report

I beg to give herein a statement of finances of the Association of Municipal Electrical Engineers as of January 29th, 1919, which completes the first year of the Association's operations.

Receipts.

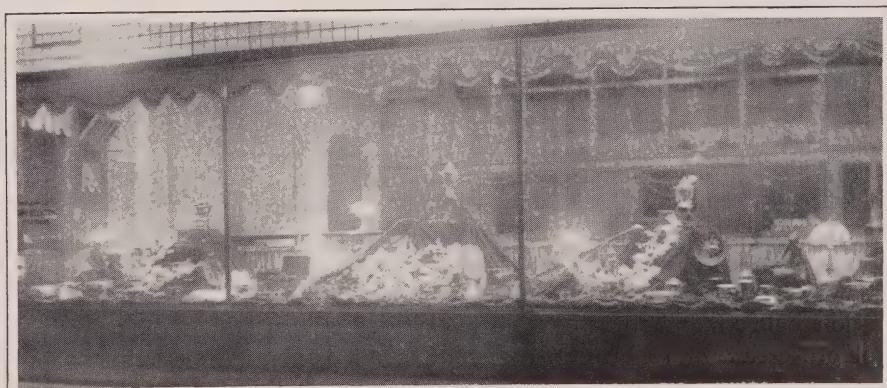
4 Municipalities at \$50.00 ea.	200.00
5 " " 25.00 ea.	125.00
9 " " 15.00 ea.	135.00
13 " " 10.00 ea.	130.00
14 " " 7.50 ea.	105.00
20 " " 5.00 ea.	100.00
21 " " 2.00 ea.	42.00
1 Commercial membership credited to year 1919 . . .	10.00
137 dinner tickets at Niagara Falls at 50c. ea.	68.50

\$915.50

Disbursements.

Music	\$ 33.00
Record books, Stationery and Printing	164.08
Discount on Cheques	5.65
Convention Buttons	10.00
Expenses of members of Executive Committee	96.50
Stenographer	25.00
Lantern	229.50
Convention Dinner at Niag- ara Falls	134.40
	—
	\$698.13
Balance cash on hand	217.37
	—
	\$915.50

(Sgd.) R. C. MCCOLLUM.



Christmas Window Display, made by the Windsor Hydro-Electric System

Convention Discussion

MR. BARNES' PAPER

The President: Mr. Barnes has presented a paper which will probably bring out discussion. Do I understand, Mr. Barnes, that the discussion should be confined to the four point in the orders which they are given?

Mr. A. S. L. Barnes, H.E.P.C.: Not at all, I leave it entirely to the discretion of those present to carry on the discussion in any manner they may wish.

Mr. A. G. Lang, H.E.P.C.: Mr. Barnes has prepared a paper on a subject which has received comparatively little attention in the technical press. It would appear that we are investing a certain amount of money in weatherproof covering for protection against accidents to linemen and interruptions to service. It is rather difficult to judge just how much protection is afforded by this method as the opinions of the authorities vary widely. In fact, as regards protection to linemen it is claimed by some that the weatherproof covering gives a false sense of security and hence leads to accidents that would not occur if the wires were bare.

The object of the paper is to get an expression of opinion from as many as possible of the members of the Association, based on personal experiences. There is no suggestion being made to remove any real protection or to introduce any additional hazards. On the contrary, it is the intention to introduce

standards of construction which will provide a greater protection.

The cost of the insulation is considerable. The same amount might be spent to better advantage in providing increased climbing space on the poles and increased separation between the line wires.

Mr. Wills MacLachlan, H.E.P.C.: Suppose that we had a dangerous gear and put around it a guard that was loose and not secure. A workman in passing trips and in falling his hand goes against the guard, which gives way and allows his hand to go into the gear. Are we in a better position with the shaky guard or would it not be better to leave the guard out entirely so that workmen can see the danger and not place any dependence upon the guard? Is this not practically what we have in using weatherproof covering on electric lines? We have an unsatisfactory guard that may give way just when it is needed. Of course I realize that when we do away with weatherproof covering, men will have to use tested rubber gloves, rubber shields and blankets. They should use them now but they are risking their lives often on the chance that weatherproof covering is an insulation.

I would like to go one step further and say that insulation that is not systematically tested should not be depended upon to protect life. Either use systematically tested rubber gloves, shields and blankets or a

substantial guard that is grounded. I thank you.

Mr. E. F. Latimer, H.E.P.C.: Referring to Mr. Hood's statement (lower left hand column, page 6). I thoroughly agree with this statement: "Insulation which is not a protection is a death trap and its omission is both a safeguard and an economy."

Our instructions to linemen in the field are to consider all wires, whether covered or bare, as live wires and to use rubber gloves in all cases while working on primary circuits of potentials of 2,200 volts or over.

This so-called weatherproof insulation used as a covering on conductors of distribution systems in the early days (about 1892) when the three-wire, direct current Edison system of 110 and 220 volts potential was in general use, was no doubt a great factor in safety to linemen and the general public, but the insulating qualities of this covering has most certainly not been raised to such an extent as to enable it to be relied upon as an absolute insulation for conductors used for primary potentials of 2,200 volts or over.

I wish to call your attention to that part of Mr. McLelland's letter (page 8) which reads, "Our practice is in favor of bare wire for primary distribution circuits. For voltages of 6,600 volts and over, we invariably use bare wire unless local regulations require the wire to be insulated, in which case we endeavor to secure a modification of the regulation.

"For 4,000 volts and in general, for 2,300 volts we use bare wire where governmental and local requirements do not conflict."

"It would be advisable in my opinion to use bare conductors for potentials of 2,200 volts and over, but to still use the covered conductors for secondary distribution and service work."

Then again, reading further: "While in a liberal percentage of cases of contact, insulation may afford protection against shock to linemen working on live wires, the presence of insulation creates a false sense of security on the part of the workmen, which tends to carelessness. The only safe rule for linemen is to treat all primary wires as if bare, and this rule will be more effectively observed if the wires actually are bare. When live primary wires are to be worked upon the use of protective devices, such as portable shields, are much more effective protection to linemen than insulation on conductors."

I wish to state that I thoroughly agree with this statement, and as Mr. Lang has suggested, if bare conductors are used a greater climbing space could be provided between cross arms, pins, etc., and portable rubber shields should be used for the protection of linemen.

One or two of the members present with whom I am personally acquainted have had considerable experience on line construction work and I would suggest that Messrs. T. E. Bell and J. W. Cook be called on to give their opinions regarding this matter.

Mr. J. W. Cook, New Toronto: There are numerous cases where, in my opinion, insulated wire has proved its value, as a partial safeguard against accidents to linemen and the linemen of other companies who do not understand the danger. I had a case of a covered wire carrying 2,200 volts coming down in the centre of the street, and a man picked it up and carried it to the side of the street and was unharmed. This same man has since been killed by coming in contact with a bare wire carrying the same voltage.

I may consider bare wire in suburban and rural districts, but am strongly in favor of using nothing but triple braid, weatherproof wire in towns where men are continually working, and where traffic is heavy. I would ask that this question be thoroughly discussed before bare wire is used in preference to weatherproof.

Mr. T. E. Bell, Mimico: I have worked quite a lot on poles in Toronto with 4,000-volt lines and the insulation proved a good feature for some of the men working around it. At one time I worked for a superintendent who thought a man with six months experience was as valuable to the company as a man with six years experience.

I might say regarding bare wire that it would be a good thing in rural districts where a man is not constantly working with it, and if otherwise he would need to be a thoroughly experienced man to handle it, as he would have to be careful at all times.

Mr. Latimer: We have had more accidents to linemen working on primary circuits of potentials from 2,200 to 4,000 volts than on our lines of potentials above 13,200 volts. No doubt some of the injured linemen have relied to a great extent on the weatherproof covering on the conductors and have been burned through their relying on the insulating qualities of it.

Mr. Barnes: I would like to know the proportion of linemen working on high tension and low tension lines.

Mr. Latimer: Two or three years ago the percentage would probably be 75 per cent. on high tension line and 25 per cent. on low tension lines; at the present time, however, the percentages are about fifty fifty.

Mr. L. G. Ireland, H.E.P.C.: I think that the extent of the life hazard is really the essential point to be considered. As a matter of fact, if the use of weatherproof covered wire adds to the safety of the men who are working on distribution work, then I do not think it matters how much more weather proof wire costs even if the additional cost is 100 per cent. If it does not add to the safety of the men, then I think there is no reason for using it.

As far as my own experience is concerned, I do not know of any cases where the lives of men have been saved by the protection of so called insulation, but I do know of several cases where men have been severely burned and some instances where the injuries have been fatal as a result of putting dependence on the covering. For my own part I

would not put any dependence on the protection of weatherproof covering on primary or series circuits on any potential above 600 volts and I would certainly not ask any other man to do it.

Mr. J. J. Heeg, Guelph: I do not think that wire is better without insulation. In the old days it used to be insulated better. We took down some of this wire last year that had been up for about seventeen years, the insulation was in better condition than some put up recently.

I do think that 2,200-volt bare wire would be alright in some places, as the old secondary wire could be used on these lines, but use insulated, triple braided wire on low tension, 110-220-volt wire which I think would be alright.

Mr. H. O. Fisk, Peterborough: As a means of preventing accidents, if we use bare wires altogether we will have to have some way of indicating what voltages these wires are carrying.

Mr. V. B. Coleman, Port Hope: I can recollect 3 instances where weatherproof covering was probably the means of saving men's lives. In one case the lineman had ordered the power (2200 v.) cut off from the line. He climbed the pole and was seated across the two lines talking to me tapping his pliers at the same time on one of the lines. Owing to some blunder the power was turned on and his first intimation was the buzz of static sparks between his pliers and the line. Had these been uncovered I do not think he would have lived to come down that pole. Another case of a 2,200-volt line

dropped across a cement sidewalk leading to a residence. The occupant came out in his stocking feet and picked up the line with his bare hand to throw it off the walk. He received no shock whatever. The third case a man picked up a fallen 2,200-volt line and received a severe shock. A man of ours was, however, killed while handling a line covered with this material. Though weatherproof covering should not be considered as an insulation on such voltages it certainly is frequently a great protector. We took down some lines recently that had been up 29 years and it was still partly covered.

Summing things up I think there are many places where for voltages below 6,000 a great deal of protection will be afforded by weatherproof covering on lines, though with special construction and carefully put up rural lines I think that uncovered lines could often be used.

Mr. T. C. James, H.E.P.C.: Mr. Coleman might perhaps be more favorable to the use of bare wire if the illustration which he has just used as an argument against the practice is more closely analyzed. For instance, take the case of a man tapping the insulated wire with his pliers. The fact that no injury resulted from such action was due more to good luck than to good judgment. It is a bad practice to educate a lineman to take chances rather than exercise precaution. If the wires in this particular instance had been bare this man, without doubt, would have taken particular care to keep from touching them or coming in contact with them. Under

the impression that the insulation was a protection no precaution was taken by the lineman in touching the wires with his pliers, whereas with bare wires this man would have been particularly careful to keep clear of them. In reality he was taking almost the same chance as if the wires had been bare, and he was very lucky to escape without injury or loss of life.

All the H.E.P.C. engineers who have spoken this afternoon in favor of the use of bare wires for primary purposes, it may be interesting to know, are members of the Committee which was appointed by the Chief Engineer to discuss this matter and submit a report to the Commission concerning same, and the entire subject introduced by this paper was placed before the Convention with the idea of giving the Chief Engineer and the Commission the opinion of others outside of the Commission's staff.

I do not think that you will find an engineer in this country or in the United States who will claim that weatherproof wire is a protection. They will all tell you that it is not. In my opinion the use of weatherproof covered wires is purely sentimental, and the sooner the present conditions are altered the better.

This entire question is one which is being given very serious consideration by the engineers of the Commission and by every other engineer who has anything to do with the use of so called weatherproof insulated wire, as it exists to-day. It is a false protection, and the men who are handling these wires will, without doubt, make a greater

effort to keep clear of them if they are bare than if they are covered with weatherproof insulation. They will also exercise greater precaution when working on poles carrying bare wire.

In view of existing conditions and the false security afforded by weatherproof covered wires, there is no doubt whatever that some drastic change should be made which will tend to relieve the unsatisfactory state of affairs, caused by the use of weatherproof covered wires for primary lines.

Mr. Sifton, Hamilton: I think the last speaker, contrary to his statements, put up a splendid argument for "*no drastic action should be taken.*"

The lineman must be cautioned on what class of work he is working and all linemen must have time for education when any change is to be made. We have had success in Hamilton and not had a lineman killed since the start of the work, and we have had to string our conductors through a network of wires that I do not think exists anywhere else in Canada. We have had a few accidents, but nothing very serious.

I might say also that this whole discussion would in my opinion have been better without the relative cost entering into it.

Mr. E. M. Ashworth, Toronto: Referring to Mr. James' remarks that those who opposed the suggestion of using bare wire were all men outside the committee, I think this is indicative of the attitude of the public, who seem to be strongly of the opinion that wires carrying a

dangerous voltage should be insulated.

It is an accepted principle that live parts should either be adequately insulated or else left bare. In view of the opposition that is sure to be met in introducing the use of bare power wires it might lead to more satisfactory results if the Committee were to see if it is not possible to devise insulation that would be safer than that used at the present time. Several speakers have pointed out that the question of price is secondary. The difference in insulating strength between double braid and triple covering shows the marked advantage of an extra layer of insulation and it is not inconceivable that a reasonably permanent and effective insulation might be developed.

To illustrate the value of insulation, even if good only when it is new, it should be borne in mind that in stringing new wires there is always a danger of the new wires coming into contact with live wires already in place and the danger to the linemen is greatly lessened if the insulation of the new wire is effective.

Mr. Latimer: Might I ask if a man stringing covered wire would take the same precaution as handling bare wire?

Mr. Ashworth: It is not likely that men would take the same precaution, but it is always difficult to avoid contacts of this nature. If by the use of insulation it is possible to make men's lives less dependent on extreme caution, it is desirable to do so.

Mr. Heeg, Guelph: Has the

Committee consulted the Underwriters?

Mr. Lang: No.

Mr. Ireland: I would like to have the opinion of some of the manufacturers of wire."

Mr. W. R. Ostrom, Northern Electric Company: I would have preferred very much not to have been asked for an opinion as a manufacturers' representative. I am quite willing to admit personally that from my experience so-called weatherproof insulation is not an insulating medium on potentials over 2,200 volts, but I think there is a slight advantage over the entirely bare wire on potentials below 2,200 volts. Personally I think, however, that it is not a safe protection at any time to life, but from a property manufacturing standpoint, I hope we continue to sell it for many years to come.

Mr. W. F. Wright, Eugene F. Phillips Electrical Works, Limited: Looking at the figures on the black-board (table M) one might think that there is some ulterior motive in my remarks, but I can assure you that such is not the case.

About eleven years ago I was responsible for wiring a small town with bare wire, but as soon as any extensions were required the operating superintendent began using weatherproof wire. Since that time I have come to the conclusion that in practically all distribution systems of 2,500 volts and under, the use of weatherproof wire is a decided safeguard.

The previous speakers have all emphasized the question of safety to the man working on the pole

and recommend the constant use of rubber gloves, guards, etc. This is as it ought to be, but at the same time the safety of men working on adjacent wires, such as telephone and telegraph lines, and the general public is to be considered. There have been numerous law suits on account of accidents where the question of weatherproof insulation has been a very important point in settling the responsibility for the accident and the use of bare wire would result in heavy damages.

It is true, as Mr. MacLachlan says, that a number of fatal accidents have not been prevented by the use of weatherproof insulation, but I am sure practically every lineman at this meeting who handles, 2,200-volt lines when alive, can recall numerous instances when serious accidents have been averted by weatherproof insulation.

Mr. R. H. Martindale, Sudbury: I have in mind three cases which occurred in our town, two of which were with Bell Telephone Company, and C.P.R. telegraph wires. The C.P.R. lineman pulled a bare telegraph line over a 2,200-volt covered primary, and escaped with a burnt hand. The Bell Telephone man pulled a bare telephone line over on our 2,200-volt primary, and got nothing, and in the third case a citizen grasped a broken 2,200-volt covered wire, and escaped with a slight shock.

I think that any radical changes in the use of covered wire for voltages over 750 should be very carefully considered before being adopted. I have had no experience with bare 2,200-volt lines.

Mr. C. W. Alford, London: After 19 years' experience in electric line construction, I am convinced that covered wires are far more satisfactory. I give my opinion for the following reasons: safety and freedom from trouble, cost, and public opinion.

First: In the course of erection the covered wire can be strung among other live wires and the lineman less subject to danger. Again, telephone or telegraph linemen stringing bare lines across covered wires, there is not the same danger of grounding or short circuiting the power lines and destroying the telephone or telegraph apparatus. Take the case of the Helena Costume Company in the City of London, where the bare wires fell on the roof of the Fitzgerald Building, setting the building on fire by contact through the metal roof and charging other metallic appliances in the building. The last big sleet storm the whole Bell Telephone Company's lead on Adelaide Street fell across the City's 2,300-volt lines, but as these wires were covered no damage was caused to telephone equipment at the Central offices or to the cables. The Bell linemen worked on repairs and did not even notice any current on their wires.

Secondly as to cost: The covered wire is of course more expensive, but this difference is more than made up by the fact that linemen can work faster and with a greater degree of safety. One accident caused through bare wire might more than offset the cost of covering for an extremely large installation.

Finally, public opinion would be against anything that might appear to be dangerous. Covered wire is demanded as there is far less danger to public if fallen wires are insulated. A good instance of this is the case of a boy who was killed at St. Peter's school by picking up a guy wire which came in contact with a bare 2,200-volt line. If this 2,200-volt wire had been covered the accident would probably not have occurred.

We supply our linemen with rubber gloves and mats, but as soon as your back is turned they will throw them down and work without them. I have had 100 men working for me at one time when building the Hydro lines in London, and I have not had a man hurt or killed by coming in contact with our own wires.

We never kill our lines up to 2,300 volts. Our men work on these alive.

Mr. W. F. McKnight, Northern Electric Company: I have always considered weatherproof wires more safe, but I did not know they were so good as described by Mr. McGann. He says: "The tests show that in general even wet insulation may, for 2,300 volts, be depended on for ten years, if the insulation remains intact, to prevent break-down when wires of opposite polarity swing together."

We, as manufacturers, are prepared to co-operate with you and give you what you want; it is our duty, and if you want a better insulation, if we can get together, we will try and give it to you.

The President: The Hydro-Electric Power Commission would like

some expression of opinion from this meeting. No one has had any experience on bare wires, or perhaps some resolution might be drawn up along the lines, that the meeting would approve of the use of bare wire up to 2,200 volts.

Mr. E. R. Lawler, H.E.P.C.: Several of the gentlemen taking part in the discussion have emphasized the point that insulation protects where workmen of other companies let wires fall or pull wires over primaries. This likely applies to 2,200 volt primaries. I would like to ask if any of these gentlemen know of cases where the insulation has been a protection under the same conditions but where the primary voltage is 4,000 instead of 2,200. My experience has been that where wires fall on or are pulled over 4,000-volt primaries the insulation breaks down. My opinion is that when building primary lines it would be best to provide poles of sufficient height so that wires of other companies would be below the primaries instead of above them.

Mr. W. H. Mulligan, H.E.P.C.: I may say that from an inspection recently made, I find white, brown and green glass insulators used in various places and that, while the original idea was good, the proper color was not always used in repair work, as the correct colored insulator was not available.

Mr. J. J. Jeffery, H.E.P.C.: The system in Windsor was constructed using the insulator color scheme, and I would ask Mr. Perry to tell us how it has worked out.

Mr. O. M. Perry, Windsor: We like the insulator color scheme very

much, as it assists greatly in operations and maintenance of lines. The linemen like it, and it certainly helps to prevent accidents.

Mr. R. T. Jeffery, H.E.P.C.: Linemen who will not take the trouble to put up the proper insulators should not be employed.

Mr. Mulligan: The men explain: "The insulator market is in such a state that we have to take what we get. If we ask for brown, we have to take some other color.

Mr. Barnes: Referring to Mr. Sifton's remarks on my table of relative costs I would like to assure him that I am not of a mercenary turn of mind with no thought of the safety of the men. My idea was that the points should be discussed in the order named in the paper in which

the question of safety is given joint place; cost, it will be noted, comes third, and it was in my mind that so far as might be possible cost items should be disposed of before the next was taken; in this way the question of cost would not be considered at all until it had been decided whether or no the degree of safety obtained was of value, from a safety standpoint.

Mr. Ireland: I would suggest that a committee be appointed composed entirely of outside superintendents and managers, principally men who have had experience and are thoroughly aware of life hazards, and that this committee report to the Association at its next meeting.

The President: We will decide on the personnel later.

MR. JOHNSON'S PAPER

The President: Many do not believe in the principle of selling appliances, although I think the tendency is towards the central station having an appliance department. You have all your views and we want you all to think that you are real live members of the association by getting up and discussing this paper. We are fortunate in having with us to-day Mr. W. L. Goodwin who has been mentioned in this paper, and I am going to call on Mr. Goodwin now to lead the discussion."

Mr. Goodwin: I thoroughly agree with the points brought out in the paper, taking it for granted that the author believes in sound merchandising methods. There is no question but that all central stations ought

to enter into this field, because it is unlimited. The main consideration is whether they go into it for profit or merely to put somebody else out of it by price-cutting methods. Under present conditions it is impossible for jobbers and dealers to make much profit because manufacturers do not leave a sufficient margin. The utility company—whether publicly or privately owned—might pay for advertising of electrical appliances which would benefit dealers in general, since the utility derives revenue from the current consumed.

Though the electrical dealers in the United States have been on the job 15 years, they have only reached 5 per cent. of the population. There is \$100,000,000 worth of electrical goods sold annually, while it has been

estimated that there is a possible trade of \$500,000,000 to \$800,000,000 per annum. It is therefore not a question of whether or not central stations should sell electrical merchandise, but how they should sell them. The central stations are in the business primarily to furnish energy, but I would like to see them open up stores that would be attractive and run on lines that would benefit the whole business.

In regard to the writer's statement that he had never heard of any central station entering into the business merely for the purpose of making profit, I know of several in the United States that have gone into it strictly as a business proposition and a separate enterprize.

I also disagree with Mr. Johnson's statement that manufacturers should open up retail stores in various centres. Production and retailing are entirely different undertakings, requiring entirely different organizations, and the small local man in a community is invariably in a better strategic position than is the manufacturer operating over a wide area. We have been struggling with this problem in the United States, and the manufacturers have decided against invading the field of retailing.

The real point at issue is whether central stations will go into the business on the same basis as the dealers. Personally, I would rather see them keep out of the field altogether than to go into it with the idea of monopolizing it by price-cutting methods, but I would like to see them conduct retail stores

along proper lines that would benefit the whole industry.

Mr. Perry, Windsor : The primary object of any central station is to sell electricity. To create a demand for electricity, appliances are used and these can be placed on the market, either by the private dealer, central station or by both. The big question among central stations appears to be whether they should go into the merchandising business or not and if it would not be better to leave it to the dealers.

Windsor has a population of less than 30,000. Our domestic rates are double those in Toronto and we are further handicapped by being close to Detroit where appliances can be bought at a very low price. We have had a Hydro Shop from the very first, where we maintain resale prices and have attempted to use the best merchandising methods. Our gross sales for the last four years have been :

1915, \$11,050	1917, \$44,793
1916, \$24,931	1918, \$66,243

and in spite of our increase in business, all the local dealers admit they are doing more business to-day than they ever did before. I am thoroughly of the opinion that if we want to build up the appliance load, the central station must get in the merchandising end, and if they employ proper methods the business of the private dealer will also be increased and everybody will be satisfied.

Mr. R. T. Jeffery of the H.E.P.C. asked Mr. Perry, with regard to the sale of appliances in their Commission, if they had done a lot of

advertising and if the local dealers had been advertising at all. Mr. Perry replied that very little advertising had been done by them or by the local dealers either. The Hydro Shop usually ran one copy per week in each of two local papers.

Mr. Shearer, of Smiths Falls, asked Mr. Perry if he had done any house-to-house canvassing, and Mr. Perry replied that he had not yet but intended doing so this year.

Mr. J. F. S. Madden, H.E.P.C.: Mr. Johnston's able paper in almost every paragraph makes reference to some particular phase of the merchandising problem, which might be enlarged upon and discussed to great advantage, if time would permit. The paper I assume may be taken to indicate the policy of the Montreal Light, Heat & Power Consolidated, and they have, we understand, made a great success of this end of merchandising appliances. The various points referred to, will therefore, be of great interest to Hydro Municipalities which have a Hydro Shop. To the majority of members, however, the question of whether or not the town should merchandise appliances and lamps is a point at issue; not only in Canada but throughout the United States the question is a very live one. Fortunately, while there has been a great deal of honest difference of opinion on this question, we have apparently reached a point where it is possible to see the result of the experiences of the central stations throughout the country during the past few years, gradually evolving what might be looked upon as standard practices in this connection.

In the case of the average town on our system the local commissioners have this problem to decide and probably find it a difficult one, as it is often influenced by local conditions. If there judgment depends upon the recommendation of the municipal engineer, the question may be decided one way or the other, because, as I have pointed out, up until recently, there has been an honest difference of opinion as to the best policy, even among experts. A great deal has been written on this question during the past year, and it now appears to be pretty generally accepted, as shown by the practice of the largest and best organized central stations throughout the United States and Canada, confirmed by the fact that the principal towns on our own system are doing business successfully, that the merchandising of appliances is a vital function of the central station. It is said that 65 per cent. of the appliance sales in the United States are now made through central stations. Mr. Goodwin, to whom you will have the pleasure of listening to-morrow, is without doubt one of the foremost merchandising experts in the country to-day. His experiences are that the retail distribution of electrical supplies and appliances can be increased many fold by proper merchandising. Or putting it differently your appliance load can be increased many fold. The successful operation of the local system is therefore involved. It will be a great pity, if the convention does not take advantage of this splendid opportunity to record definitely the consensus of opinion

of the municipal engineers of the Province as a body on the question of whether or not the central station should merchandise appliances.

Mr. E. J. Sifton, Hamilton: I would suggest that a copy of this paper be sent to all commissioners in control of the municipalities, specially marked and addressed to them. This would be a good idea because some municipalities have a lot of trouble convincing their commissioners. If the municipal engineers as a whole passed the resolution, I think it would have a very beneficial effect.

In a city there are a lot of old houses. Electricity was not known when they were built. Now they do not belong to the man who lives there, but the landlord does not want to go to the expense of wiring these houses. I would propose doing the wiring and making the landlord responsible for anything from \$3.00 to \$6.00 per month. Some arrangement should be made by Hydro Systems to help out with the wiring of these houses, on a reasonable basis.

The President called for any remarks from those opposed to merchandising of appliances.

Mr. Heeg proposed that, as suggested by Mr. Sifton, copies of this paper, especially ear-marked, be sent personally to the Commissioners of the various systems. Mr. Myers seconded this.

Mr. H. H. Couzens, Toronto: With regard to Mr. Sifton's suggestion of sending copies of this paper to the various municipalities, the difficulty seems to be, as I understand it, in those municipalities

where they do not sell appliances. An appliance department, to my mind, is highly desirable. I am sorry that we have not heard from some one who does not sell. Probably they find it impossible to express themselves. Perhaps they feel that their commissioners, for some reason, do not favor sales.

The power shortage has kept back the sale of appliances. Take for instance ranges. We have not pushed these for quite a long time, but in spite of that our business has increased in small appliances—lamps, etc. Our appliance department is a separate business. All sales are credited to it and all the costs are debited against it, and we find that not only have we the benefit of the increased sales, but the appliance department is absolutely self-supporting.

Toronto now has a Contractor-Dealers' Association, and since that association has been formed there has never been one hitch, due largely to the fact that we have been able to get together and talk over matters, and there is never a problem that has cropped up that has not been settled.

Mr. Sifton referred to the difficulty of wiring old houses from the point of view of persuading landlords to do this.

A number of free wiring schemes have been tried in different parts of the world, but I know of none that were really successful considered all round. Where some landlords are slow to wire their houses I would suggest as a help supplying an illuminated sign in cases where houses for rent are wired, worded "This

house is wired for electricity." There is no doubt which house would rent first.

I suppose all municipalities sell on the "Assisted Payment" or "Easy Payment" System, which is very helpful as a means of extending business.

Mr. V. S. McIntyre, Kitchener: I think it would be well to include the discussion on this paper which no doubt will be printed.

Mr. K. A. McIntyre, Beattie & McIntyre, Toronto: I do not know whether this is the first time a contractor-dealer has attended one of the meetings of this body, but it will surely not be the last time. The contractor-dealers do not need any "club," referred to by Mr. Couzens, and it is not their policy to brow-beat any one. We are anxiously waiting for the means of co-operating with your body and appreciate the interest shown in our problems. As soon as we have the means for discussion of our common problems, so much sooner will we all in the electrical industry be able to take full advantage of the opportunities before us.

Mr. J. G. Archibald, Woodstock: Woodstock has not sold appliances to any great extent except lamps, irons and toasters, and of these have sold quite a number.

Our reason for not pushing sales is first; the location of our office is bad and no show room is available, we have also had some opposition from the local dealers, but the opinion expressed here to-day seems to be that these men will eventually be helped. We have also had a difference of opinion from members

of our board, some being in favor of having a Hydro Store while others have thought we should not interfere with local dealers at all.

We have always endeavored to assist the local dealers as much as possible.

Mr. H. O. Fisk, Peterborough: We are not opposed to handling appliances, but we are situated somewhat like Windsor. We are carrying a few things but generally speaking, the dealers handle the most of this business, and we are doing everything we can to assist them—believing in the maxim "Live and let live."

Mr. Geo. E. Whiton, Dundas: I think that it should be stated that the prices of all appliances sold by the utilities must be approved by the Hydro-Electric Power Commission of Ontario (according to their definition of rates).

By whom should the resale prices be fixed? There are different grades in all appliances and I suppose this would have some bearing on the resale price.

In our town we have several hardware stores handling lamps and appliances, and they are of the opinion that we sell lamps at too low a figure, but The Hydro-Electric Power Commission at one time ordered us to cut our prices down, allowing us about 10 per cent. on the cost of lamps to take care of overhead charges.

Mr. J. F. S. Madden, H.E.P.C.: The point has been raised as to what size town can support a Hydro Shop. Any town large enough to support a contractor-dealer is large enough to support both a Hydro

Shop and a contractor-dealer, because if the relations are harmonious, the sale of appliances can be increased many fold, and the higher priced appliances can be best handled by the municipality, and as all the appliance sales help to build load the central station should be doubly interested in the sale of appliances and should and can afford to do educational advertising from which the local dealer may profit as well as their own business.

Mr. H. F. Shearer, Smith's Falls: In our town we have two hardware stores handling appliances, and a jeweller handling lamps. I made a point of seeing these men and asking them how their sales of appliances in 1918 compared with the previous year. Both hardware dealers expressed themselves very well satisfied, though their records of sales were not separated from their general business.

Mr. F. M. Dusenberry, Hughes Electric Heating Co.: Up to the present time, the central station has been the source of distribution of our ranges. The dealers, with a few exceptions, have not pushed the sale on the same scale as the central stations. This has been due to the fact that to properly push the sale of ranges, quite an investment is necessary, which most dealers were unwilling to make; but in the future we hope for better co-operation from the dealers. We have never made any distinction in prices between the dealer and central station.

Mr. K. A. McIntyre, Beattie & McIntyre, Toronto: Mr. Madden suggested that the contractor-dealer

does not develop the electric range business. If the contractor-dealer receives 15 per cent. gross profit and is expected, according to good merchandising practice, to spend at least 5 per cent. of the gross sales on advertising, how can he afford to develop the market. His time alone would not be paid for, to say nothing of overhead expense."

Mr. C. T. Rutland, The Moffat Stove Co. Ltd., Weston: I have found that the central station is the natural source of electric range sales.

We have to-day 6,800 electric ranges in operation, practically all have been sold through the central station. There is a certain amount of trouble that will develop in the range business and the central station have their trouble men who are able to take care of same.

I find a large percentage of the electrical dealers in the smaller places do not understand the electrical ranges and we are put to a lot of trouble and expense, sometimes by the simple blowing of a fuse or the breaking of a lead wire in shipping. In closing would say we are in favor of the public utilities department having salesrooms and working in conjunction with the electrical dealers and contractors wherever possible.

Mr. J. E. Skidmore, Cobourg: Why not stamp price on all appliances? The shoe and cereal people have met with marked success merchandising goods with marked prices.

The President: Mr. Goodwin will no doubt touch on the matter of retail prices to-morrow.

MR. GOODWIN'S PAPER

Mr. Goodwin. We have two distinct problems—one which relates to the creation of our energy producing stations, the production of energy, its adjustment and sale. That problem involves financial and engineering questions.

The other problem of the industry is the production of the articles for the distribution and use of the industry's principal product—energy.

In the first case, we are dealing with a commodity which, to my mind, will develop, and can best be handled by a single interest, and being an article of general public use, will sooner or later resolve itself into one of public ownership. Perhaps the Province of Ontario is just a little advanced of the rest of the world in that development, but sooner or later the question of public ownership of our electric lighting companies is bound to come.

For the present, therefore, I am not concerned in whether the utility company is publicly or privately owned—that question will take care of itself. My problem has to do solely with what I call the manufacture or merchandising part of our business, and that part never can become a municipality and it never can get into the hands of public ownership, because we are dealing in what I call "style and habit goods" and we are depending largely on the warerooms of the general public, whose ideas vary widely as the ideas of a woman in connection with her dress. We will always be selling articles in competition with each other to meet the whims

of the great majority of the people and no two people will be satisfied with the same article. There are certain exceptions, of course, for example, the incandescent lamp does not permit of any wide variation in style and the public are a little concerned in the particular kind of lamp that they use; because the lamp becomes a necessity it is not generally understood by the buying public, and they are not concerned in its manufacture or style so long as it gives sufficient light.

When it comes to the buying of flat irons, etc., and 1001 other devices, there we get individuality and each purchaser prefers to make his own selection.

Furthermore, as we have in the first problem, the distribution of energy, one which involves primarily financial and engineering problems, in the second part of the industry it is entirely one of merchandising and good salesmanship. We have experimented with every conceivable policy to keep this project before the people. I have thought out this problem for more than 28 years, and I think I have tried every policy that was ever suggested.

With straight merchandising we have got to follow the customs of 500 years, and there is nothing new about selling commodities.

In the States the idea was advanced by some of the early buyers that the way to get to the public was through the medium of what they chose to call "selling at cost" or "bargaining sales," and this we experimented with for 10 years.

Selling electrical energy and electrical merchandising are different propositions.

No company can reach all of the people.

In the discussion yesterday, it was pointed out that many small houses had not been wired. People have different ideas about the wiring of their homes and different ideas about appliances.

You can only sell to that part of the public to which your particular argument appeals, each with his own idea of selling, each with his own particular case, then you are able to present to the public numbers of articles of different kinds of products, and if one man cannot make a sale, another man will.

In the country from which I come—the Pacific coast—we try out large ideas in large communities in order that we can determine which plan is best in order to give the greatest result.

The greater the number of retail stores, the greater development you will get to the industry.

I am not concerned in how to lessen your central stations, where you locate them, how you distribute your energy, nor am I concerned whether you make your local distribution overhead or underground, nor how you sell your energy to the public. That is a problem which has not been standardized, and there are wide differences of opinion, so we must go on for perhaps many years before we come into agreement as to standardization on these engineering problems, and you will arrive at the best results in the short-

est possible time by the development of organizations such as this.

We have learned a lesson and we know what is best, and after 500 years' experience with common merchandising problems, there should be no reason to doubt as to what are the best methods to apply.

I come to tell you what we have accomplished in the States by experimenting with different ideas, and it will be up to your judgment to decide which course you have to follow.

It is not a question of building central stations for the purpose of forcing the use of electricity upon the public, but under the proper organizations and best selling methods, it will become one of developing central stations at a rate fast enough to take care of a demand that will accrue, and the central stations cannot keep up with the development.

To accomplish the best results we must have contact with the best high-class retail stores operated all over the Dominion of Canada. The greater the number of stores, the more rapid your development.

I was obliged to leave the room yesterday just as you were discussing whether you were in favor of bare or weatherproof wires. The merchant is not interested in these problems and prefers to rely upon the judgment of engineers.

The first question you are likely to be asked by the average person is: "What is this electricity?" You do not know; that immediately sets up doubt in the public mind. We are selling a commodity we do not know ourselves. That throws suspicion in the public mind; then we

attempt to explain some of these engineering problems, perhaps to the house-wiring customer's boy of 15 who is interested in electricity.

When you go down the street to pick an iron, there is one marked to sell at \$6.00, another at \$4.00, and another at \$3.50, the public becomes suspicious and they lose interest in electrical things and electrical people. Therefore, we must get together the men in the industry with the best ideas, we must go into it somewhat as it is a story we must all tell in the same way.

I do not think we should talk with the public on these technical problems which enter into the central station part of the industry. It is too deep for the public to understand.

If we develop these organizations through the local boards of trade, we could give a standardized lecture on the same night, on the same subject, throughout Canada. The papers would take it up and create public interest. We could advocate lectures on Accounting, Selling, Distribution or any other subject, and we could talk of them in every part of Canada, and could bring the thoughts of all the men on the subject at the same time and get a solution of these problems.

Through lack of organizing, we are discussing to-day in Toronto, problems of distribution that Vancouver perhaps justified. If we take it all in one story, we should reach a conclusion much more quickly.

If every man connected with the Hydro System in Ontario was to-morrow morning to become inactive

there would be a certain number of industries in Ontario would suffer.

Therefore, let us centre our activities upon the best things to give everybody an opportunity, and we are going to enjoy the confidence and support of the people always.

We have seen there are two problems and I have now come to the Wheatstone Bridge.

This so-called "Goodwin Plan" has brought no end of worry upon me, but I am a firm believer in the thing I am doing.

I do not contend that this idea is the best thing for the people of Canada. I do not expect that you accept it or any other plan, but you should come to some common agreement on some kind of plan and the people will get the benefit of your Commission.

Mr. Sifton, Hamilton : I would like to express my appreciation of the lecture, and would ask whether there should be a clause in the agreement or contract that there should be no commissions for services not rendered, such as wholesalers claiming discounts yet not giving service by carrying reasonable stocks for prompt delivery. If a man does not give service, he is not entitled to any of the shares of the profits in my opinion.

Mr. L. G. Ireland, H.E.P.C. : During the past ten years we have been following in Ontario, the same line of evolution which has been followed by the central stations in the United States for even a longer period. We have passed through the stage where we used to believe that the only way to sell electrical merchandise was by cutting prices

and putting on bargain sales continually and installing apparatus at actual cost or less. Most of us have come to realize that this policy is entirely wrong and that there is no sound reason why the merchandising of electrical appliances and apparatus should not be on precisely the same basis as merchandising of any other commodity. It seems to me perfectly obvious that as far as the Commission or any other central station is concerned, the merchandising of appliances is a minor function; the primary function is to supply electric services. This latter job has been carried out fairly successfully, but when it came to merchandising, we have not succeeded as we should have done because we did not know very much about retail merchandising. The old method of cut-rate business interfered in an absolutely unfair manner with the electrical dealer-contractors, men who are in a legitimate business and fully entitled to make their living by that business without any interference other than that involved in plain commercial competition, *i.e.* with everybody on an equal price footing and the merchant giving the higher grade of service winning the higher proportion of the total available business. The old policy, as we all know, resulted in much hard feeling, recrimination and mutual opposition between the central station and the contractors and the net result was that this lack of harmony resulted in the useless expenditure of much energy in combatting one another, with the final upshot that the proper distribution of appliances and the

intensive cultivation of the appliance field was neglected.

What we are all aiming at now is to get away from this condition of internal warfare in the industry and to bring about proper cohesion and co-operation between the various and hitherto conflicting elements. Mr. Goodwin has focussed the attention of the industry on this point and has blazed the trail which it seems to me we all must follow. I think we all understand pretty clearly the general policy which Mr. Goodwin advocates and the road which must be travelled in order to obtain the results to which he points.

A few practical examples of the operation of the Goodwin Plan are beginning to stand out in Ontario and the case of Mr. Perry at Windsor is one in point. In that instance, as I understand it, it has been a basic policy from the beginning, to maintain resale prices and to advance the retailing of appliances by the methods followed by any sound retail business. The results speak for themselves. Mr. Perry's sales of lamps and appliances are growing rapidly year by year and on a per capita basis are probably the equal of anything to be found in the Province. Together with this must be considered the fact brought out by Mr. Perry in yesterday's discussion, that he is assured by the Windsor contractors that their retail sales have grown along with his, so that apparently both the central station and the contractors are thriving and there is general satisfaction and co-operation on both sides.

Mr. J. E. B. Phelps, Sarnia : It is the primary object of the central station to sell current. The sale of appliances is a secondary consideration and can be safely left to the contractor dealer to take care of.

The contractor dealer obtains orders for house wiring, sells the customer a few fixtures and possibly some appliances, and then turns the customer over to the central station which connects up his service, and supplies the customer with current. The central station gets this increase in business without effort. It may be advisable for the central station to handle the larger appliances, such as ranges, as the average contractor dealer is not in a position to finance this business. It is up to the central station to get behind the contractor dealer, and help them out in their advertising and house wiring campaigns.

The President : I am agreed with Mr. Goodwin. There were 700 electric ranges sold in London practically without any profit. Now the ranges are being sold at standard resale prices and will be from now on, because the people of London are convinced that the electric range is the proper thing to cook on, and it is through the Hydro-Electric Department that such has been brought about. Do not let us always put the idea first about increasing the load. We should put human contentment ahead of commercial prosperity. Take the appliances that Mr. Goodwin mentioned. The ice machine is not a source of revenue like a range. That machine, if it can be merchandised at a reasonable price,

is giving something to the housewife that is going to make for contentment. Human contentment is more important than increasing the load.

Mr. J. F. S. Madden, H.E.P.C. : The discussion so far apparently indicates considerable difference of opinion. This I believe is due to the fact that Mr. Goodwin is championing a new era, and I understand that not until the end of the present year will the work of organizing the electrical industry with a view to putting the Goodwin Plan in operation be completed; while in the minds of many discussing the paper there exists the spectre of the business relations that have existed in the past. The policy of the municipalities on our system in the past may not be entirely in unison with the harmonious relations which are to exist between the various interests in the electrical industry under the Goodwin Plan, but it is equally true that the policy of private utilities, manufacturers, jobbers and contractor dealers outside of the Commission have been equally out of tune with Mr. Goodwin's symphony. Mr. Goodwin has made a very momentous announcement to the effect that he has ready a formula for price making to replace the old practice of price fixing. This idea is of great importance, as it will enable him, when he succeeds in bringing about harmonious relations within the industry, to extend the harmonious relations to include the public. Because, if the new formula will make prices based on the idea of compensating for service and on service which is necessary, the public will doubtless endorse his plan fully.

Mr. Goodwin referred to the Commission as clamoring for class differentials. I wish to correct, if I can, the possible misunderstanding that may arise in the minds of some of those present in this connection, although I do not mean to accuse Mr. Goodwin of any thought that the statement would be taken in the wrong way. On the Hydro-Electric System of Ontario there are towns varying in size from cities such as Toronto to very small municipalities with a few hundred of a population. In the larger centres where it is necessary to hire a new business manager, it is not difficult to advance intensive selling methods, designed to bring about very desirable results that Mr. Goodwin has pictured in the way of increased business, and in many of the small towns the municipal engineer or manager may be able to develop his merchandising business effectively, but in the case of still smaller municipalities where the local superintendent may have to combine all functions from general manager to office boy, there is a large field for sales developments and the Commission, is therefore, anxious to assist all such towns and the larger municipalities where the service is desired. In distributing appliances to the municipalities the Commission is not clamoring for class differentials. The existing selling schedules are not of our making. We have to accept selling schedules as we find them. If maximum discounts can be obtained by quantity purchases or by inducing the manufacturer or distributor to give us the maximum discount

classification, we merely operate under conditions and schedules as we find them, and we do believe that we are giving a real service to the municipality, which under the new plan would doubtless be compensated for by recognized differentials.

F. W. Chapman, Hurley Machine Company, Ltd., Toronto : I would like to give you a personal illustration of the advantage the central station has been to the local dealer by handling certain appliances. We have gone into towns and tried to get the local dealer to take up our line of electric washing machines, but without success, his contention being that the machine was too high price and that they could not be sold in his town. We then got the central station to handle the machines with the result that they did make sales, disproving the contention of the local dealer and proving to him in a very practical way that he had not properly sized up the situation and, as a consequence, he got after this business on his own account, with satisfactory results.

If it had not been for the central station leading the way, it would have taken a lot of educational work, through some other channels, to show the dealer the opportunity that was lying at his door. Therefore, the central station, in this connection, has done good work and I believe, in making this statement, I am but voicing the opinion of other manufacturers and jobbers of high-class electrical appliances.

Who's Who in Hydro?

OSWALD H. SCOTT, local manager for the Hydro-Electric Power Commission of Ontario at Belleville, was born in Oshawa in 1887, attending High School there and afterwards completing his education at McGill University from which he graduated with a B.Sc. degree in civil engineering in 1910.

While attending the university he spent his summers engaged in practical work. One summer he spent with the Dominion Bridge Company on construction at Kirkfield where an hydraulic lift lock was being built, and two summers in the same company's general offices at Lachine.

After graduating he joined the staff of Smith, Kerry and Chace and was engaged for two months in their Toronto office, later going to Portland, Oregon, where they opened a new branch to take charge of a railway and power development. The company was known as the Mount Hood Railway & Power

Company. Mr. Scott's duties were those of chief clerk and secretary to the late C. B. Smith, who was manager of the company.

After spending one and a half years on the above work he went to

Boise, Idaho, as secretary-treasurer of the Crane Falls Power & Irrigation Company, the company being engaged in building a power plant at Crane Falls on the Snake River and Irrigation Works at Grandview.

In 1913 Mr. Scott was offered a chance to return east and accepted the management at Belleville of the Trenton Electric & Water Company, which in March, 1916, was taken over by the Ontario Government. Before leaving the West he was married to Miss Hazel Grigsby and has one daughter.

He is chairman of the Membership Committee of the Association of Municipal Electrical Engineers and is a firm believer in the central station carrying on an appliance and wiring department in connection with its central station work.



OSWALD H. SCOTT



Selling Lamps Under Guarantee

By J. F. S. MADDEN



WHILE it is not possible for us to obtain Hydro lamps maintaining our high standard of quality and at the same time meet the price competition of inferior lamps, when you understand fully the nature of the Hydro guarantee, you will be fully convinced that you are in duty bound to urge your customers to put a Hydro lamp in every socket on the system, knowing that in doing so you are safeguarding the consumers' best interests.

In selling lamps it has been the practice where any mention is made of guarantee to guarantee average results, which really means very little, as it is practically impossible in the majority of cases to obtain any data which might be assumed as average. The result is that the word guarantee in such cases is

used to emphasize a statement as to quality, which under ordinary conditions cannot be checked.

By following the practice outlined in this article it should be possible to make effective a guarantee *that is a guarantee* on lamps, and as the practice suggested is so evidently designed in the interests of the consumer it will undoubtedly result in a decided increase in your lamp business. It should, too, increase the confidence of the public in the Hydro Shop, and enable you to advance the sale of load-building appliances, labor-saving devices and home comforts. The volume of your business of this kind is a measure of the degree to which your consumers are realizing the benefit of a complete development of the service, which, after all is more than just mere distribution of electrical energy.

Hydro Quality Lamps, both

vacuum and gas-filled are now guaranteed to have a life, after installation, of 1,500 hours, except the 60-watt nitrogen, on which the guaranteed life is 1,000 hours. Lamps burning less than the guaranteed number of hours will be replaced on the basis of the hours they burn. Full allowance will be made for loose base lamps or lamps burning white when installed.

It is intended that our guarantee feature will be used largely as a purchase inducement. The guarantee is made simple so that people can understand that it is a workable guarantee, and we expect lamps will be sold under the terms of the guarantee. The local Hydro or person selling the lamps is in effect our agent in carrying out the guarantee. The manufacturer assures us that they will stand back of the adjustments made by such agents as though they had been made direct, until such times as they advise us to the contrary.

As it is intended that the guarantee be used as a purchase argument, it is expected that it will be construed broadly in favor of the purchaser as long as it is evident that the purchaser is not attempting to absolutely defraud us. When a purchaser returns lamps and makes a claim for adjustment because they have not burned the hours guaranteed, it is expected that the person making the claim will be questioned as to the general conditions under which the lamps were burned and when the lamps were installed. If the lamps were burned under normal conditions and his statements regarding the life seem in order, we

think the allowance claimed by the customer should be given. If the party explains that the lamps were burned under conditions that we do not consider normal (nitro lamps, for instance, burning on an angle or tip upwards) it should be explained that lamps were not burned in the right way, and no allowance can be made. If the party then refers to the conditions of the guarantee and claims an allowance, the allowance should be made, but you should go on record with the customer that no allowance can be made in future under similar conditions.

It is expected in each and every instance that a customer making a claim for an allowance will either return the lamp claimed defective or in case of a blow-out the base of the lamp. We expect you will either hold for our inspection or the inspection of the Canadian Laco-Philips Company the lamps replaced or that you write us for disposition of the lamps, in which case we will either authorize you to return or destroy the lamps.

When a claim is made for an allowance which is fraudulent on its face, we think, except under the most unusual conditions the claim should be absolutely refused. If the party insists on an adjustment and the goodwill of a valuable customer for power or appliances is apt to be lost, we are satisfied that the allowance be made, provided that the party is informed that no further guarantee on lamps will be made to him, and we will not be requested to make a further allowance to the same party.

If you do not understand burning conditions of lamps, please write for further information so that you will be able to adjust any claims that come up for short life. In the case of special claims, which you have difficulty in settling satisfactorily, we will be glad if you will refer to us for assistance.

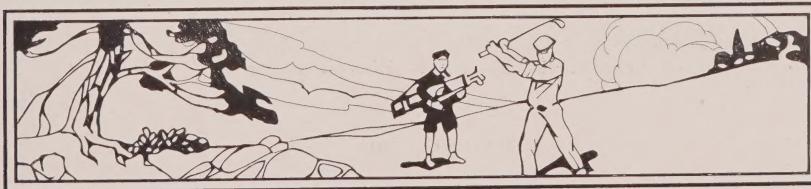
It cannot be too strongly emphasized that we want the guarantee to be a *workable guarantee*, and one that can be used by every one. We feel certain that by emphasizing the liberal guarantee we are making, that business should be materially increased.

In the case of lamps broken in transit, it is not customary for manufacturers to make good such breakages. Incidental breakages should be considered as an element of the cost of handling, the resale prices provides a margin to absorb such breakages. However, in case of breakage in transit exceeding 5 per cent. we are glad to have you report the circumstances fully. Such cases are considered on their merits, and we can very often obtain satisfactory adjustment. Under the new regulations the rate on lamps has been increased by the carriers and notice of claims for damages should be made within forty-eight hours. It is, therefore, a good plan to inspect packages carefully before giving a receipt, and in case of damage or breakages a notation

should be made and initialed by the representative of the express company. Complaints of this nature are so rare that it is fair to assume that the method of packing the lamps is quite adequate, excessive breakage indicating rough handling. Where breakage is discovered the local agent should be notified and a letter should be written promptly notifying him of the circumstances and your intention to make claim for damages. In reporting such matters to us the order number on which the lamps were supplied should be given and the original package number, as, if the lamps have been forwarded in the original packages in which we received them, we make claim, in the case of Hydro lamps, on the Canadian Laco-Phillips Company.

During the next three months a series of advertisements will be run in the newspapers in the principal towns on the system, advertising Hydro lamps. We trust that every town on the system will tie in with this campaign, at least to the extent of explaining with enthusiasm to your customers the attractive proposition we are now offering on guaranteed lamps. Why not imprint your bills with a reproduction of the newspaper ads? Suitable stereotypes may be obtained for the asking.

We are reproducing herewith two of these stereos and there are more to follow next month.





For Home Comfort

good light is essential—and rests only on discrimination in choosing your Lamps.

For quality and quantity of light—freedom from breakage and length of life—Hydro Lamps are the quality lamp.

H-24

HYDRO QUALITY **LAMPS**



HYDRO QUALITY **LAMPS**

A Brighter Light
A Better Light
Lower Current Cost
50% Longer Life

H-26

We can furnish stereotypes in a larger size, as well as this, for your bills and general advertising. Write for them.

Hydro Municipalities

NIAGARA SYSTEM

25 Cycles

Acton	1,570	Pop.	Seaford	Pop.
Ailsa Craig	462		Simcoe	2,075
Aylmer	2,119		Springfield	4,032
Ayr	780		St Catharines	422
Baden	710		St. George	17,917
Beachville	503		St. Jacobs	600
Blenheim	1,257		St. Mary's	400
Bolton	727		St. Thomas	3,960
Bothwell	695		Stamford Township	17,216
Brampton	4,023		Stratford	3,418
Brantford	26,601		Strathroy	17,371
Brantford Township	7,739		Streetsville	2,816
Breslau	500		Tavistock	500
Bridgen	400		Thamesford	974
Burford	700		Thamesville	504
Burgessville	300		Thorndale	742
Caledonia	1,236		Tilbury	250
Chatham	13,943		Tillsonburg	1,605
Clinton	1,981		Toronto	3,059
Comber	800		Toronto Township	460,526
Dashwood	350		Vaughan Township	5,008
Delaware	350		Walkerville	4,059
Dorchester	400		Wallaceburg	5,349
Drayton	613		Waterdown	4,107
Dresden	1,403		Waterford	696
Drumbo	400		Waterloo	1,027
Dublin	218		Waterloo Township	5,091
Dundas	4,834		Watford	6,538
Dunnville	3,286		Welland	1,115
Dutton	840		West Lorne	7,905
Elmira	2,065		Wellesley	708
Elora	1,005		Weston	583
Embro	472		Windsor	2,283
Erin	502		Woodbridge	26,524
Etobicoke Township	5,822		Woodstock	10,004
Exeter	1,504		Wyoming	526
Fergus	1,679		Zurich	450
Forest	1,421			
Galt	1,920			
Georgetown	1,654			
Goderich	4,553			
Grantham Township	3,133			
Granton	300			
Guelph	16,022			
Hagersville	1,053			
Hamilton	104,491			
Harriston	1,563			
Hensall	717			
Hespeler	2,887			
Highgate	427			
Ingersoll	5,300			
Kitchener	19,350			
Lambeth	350			
Listowel	2,291			
London	57,301			
Lucan	643			
Lynden	662			
Milton	1,947			
Milverton	929			
Mimico	2,004			
Mitchell	1,656			
Mount Brydges	500			
New Hamburg	1,398			
New Toronto	1,423			
Niagara Falls	11,715			
Norwich	1,093			
Oil Springs	537			
Otterville	500			
Palmerston	1,843			
Paris	4,437			
Petrolia	3,047			
Plattsburgh	550			
Point Edward	937			
Port Credit	1,176			
Port Dalhousie	1,318			
Port Stanley	831			
Preston	4,949			
Princeton	600			
Ridgewton	2,080			
Rockwood	650			
Rodney	626			
Sandwich	3,077			
Sarnia	12,323			

EUGENIA SYSTEM

60 Cycles

Acton	1,570	Pop.	Alton	700
Ailsa Craig	462		Artemesia Township	2,396
Aylmer	2,119		Arthur	1,003
Ayr	780		Chatsworth	286
Baden	710		Chesley	1,860
Beachville	503		Dundalk	750
Blenheim	1,257		Durham	1,520
Bolton	727		Elmwood	500
Bothwell	695		Flesherton	428
Brampton	4,023		Grand Valley	586
Brantford	26,601		Hanover	3,310
Brantford Township	7,739		Holstein	285
Breslau	500		Horning's Mills	350
Bridgen	400		Markdale	904
Burford	700		Mount Forest	1,871
Burgessville	300		Neustadt	470
Caledonia	1,236		Orangeville	2,381
Chatham	13,943		Owen Sound	11,819
Clinton	1,981		Shelburne	1,018
Comber	800		Tara	620
Dashwood	350			
Delaware	350			
Dorchester	400			
Drayton	613			
Dresden	1,403			
Drumbo	400			
Dublin	218			
Dundas	4,834			
Dunnville	3,286			
Dutton	840			
Elmira	2,065			
Elora	1,005			
Embro	472			
Erin	502			
Etobicoke Township	5,822			
Exeter	1,504			
Fergus	1,679			
Forest	1,421			
Galt	1,920			
Georgetown	1,654			
Goderich	4,553			
Grantham Township	3,133			
Granton	300			
Guelph	16,022			
Hagersville	1,053			
Hamilton	104,491			
Harriston	1,563			
Hensall	717			
Hespeler	2,887			
Highgate	427			
Ingersoll	5,300			
Kitchener	19,350			
Lambeth	350			
Listowel	2,291			
London	57,301			
Lucan	643			
Lynden	662			
Milton	1,947			
Milverton	929			
Mimico	2,004			
Mitchell	1,656			
Mount Brydges	500			
New Hamburg	1,398			
New Toronto	1,423			
Niagara Falls	11,715			
Norwich	1,093			
Oil Springs	537			
Otterville	500			
Palmerston	1,843			
Paris	4,437			
Petrolia	3,047			
Plattsburgh	550			
Point Edward	937			
Port Credit	1,176			
Port Dalhousie	1,318			
Port Stanley	831			
Preston	4,949			
Princeton	600			
Ridgewton	2,080			
Rockwood	650			
Rodney	626			
Sandwich	3,077			
Sarnia	12,323			

EUGENIA SYSTEM

60 Cycles

Acton	1,570	Pop.	Alton	700
Ailsa Craig	462		Artemesia Township	2,396
Aylmer	2,119		Arthur	1,003
Ayr	780		Chatsworth	286
Baden	710		Chesley	1,860
Beachville	503		Dundalk	750
Blenheim	1,257		Durham	1,520
Bolton	727		Elmwood	500
Bothwell	695		Flesherton	428
Brampton	4,023		Grand Valley	586
Brantford	26,601		Hanover	3,310
Brantford Township	7,739		Holstein	285
Breslau	500		Horning's Mills	350
Bridgen	400		Markdale	904
Burford	700		Mount Forest	1,871
Burgessville	300		Neustadt	470
Caledonia	1,236		Orangeville	2,381
Chatham	13,943		Owen Sound	11,819
Clinton	1,981		Shelburne	1,018
Comber	800		Tara	620
Dashwood	350			
Delaware	350			
Dorchester	400			
Drayton	613			
Dresden	1,403			
Drumbo	400			
Dublin	218			
Dundas	4,834			
Dunnville	3,286			
Dutton	840			
Elmira	2,065			
Elora	1,005			
Embro	472			
Erin	502			
Etobicoke Township	5,822			
Exeter	1,504			
Fergus	1,679			
Forest	1,421			
Galt	1,920			
Georgetown	1,654			
Goderich	4,553			
Grantham Township	3,133			
Granton	300			
Guelph	16,022			
Hagersville	1,053			
Hamilton	104,491			
Harriston	1,563			
Hensall	717			
Hespeler	2,887			
Highgate	427			
Ingersoll	5,300			
Kitchener	19,350			
Lambeth	350			
Listowel	2,291			
London	57,301			
Lucan	643			
Lynden	662			
Milton	1,947			
Milverton	929			
Mimico	2,004			
Mitchell	1,656			
Mount Brydges	500			
New Hamburg	1,398			
New Toronto	1,423			
Niagara Falls	11,715			
Norwich	1,093			
Oil Springs	537			
Otterville	500			
Palmerston	1,843			
Paris	4,437			
Petrolia	3,047			
Plattsburgh	550			
Point Edward	937			
Port Credit	1,176			
Port Dalhousie	1,318			
Port Stanley	831			
Preston	4,949			
Princeton	600			
Ridgewton	2,080			
Rockwood	650			
Rodney	626			
Sandwich	3,077			
Sarnia	12,323			

SEVERN SYSTEM

60 Cycles

Beaverton	821	Total 41,941
Brechin	215	
Cannington	746	
Sunderland	570	
Woodville	357	
		Total 2,709
Callander	650	
Nipissing	400	
North Bay	9,651	
Powassan	572	
		Total 11,273
Gravenhurst	1,600	
Huntsville	2,135	
		Total 3,735

ST. LAWRENCE SYSTEM

60 Cycles

Brockville	9,473	Total 14,113
Chesterville	868	
Prescott	2,630	
Williamsburg	100	
Winchester	1,042	
		Total 9,473
Perth	3,358	
Smith's Falls	6,115	
		Total 9,181
Amherstburg	1,990	
Canard River	50	
Cottam	100	
Essex	1,429	
Harrow	375	
Kingsville	1,633	
Leamington	3,604	

RIDEAU SYSTEM

60 Cycles

Perth	3,358	Total 9,181
Smith's Falls	6,115	
		Total 9,181
Amherstburg	1,990	
Canard River	50	
Cottam	100	
Essex	1,429	
Harrow	375	
Kingsville	1,633	
Leamington	3,604	

ESSEX COUNTY SYSTEM

60 Cycles

Amherstburg	1,990	Total 9,181
Canard River	50	
Cottam	100	
Essex	1,429	
Harrow	375	
Kingsville	1,633	
Leamington	3,604	

*THE aim of the
Bulletin is to
provide municipalities
with a source of infor-
mation regarding the
activities of the Com-
mission; to provide a
medium through which
matters of common
interest may be
discussed, and to
promote a spirit of
co-operation between
Hydro Municipalities.*